Owner's Manual

SUPER-SAVER XL™ HEATER

HIRED-HAND®

Agricultural Building Heater



MODEL	BTUH	kW
SS-225-XL	225,000	65.9
SS-200-XL	200,000	58.6
SS-175-XL	175,000	36.6
SS-120-XL	120,000	35.2
SS-75-XL	75,000	21.9
SS-40-XL	40,000	11.7

- *Hot Surface Ignition*
- *Wash Down Design*

FOR YOUR SAFETY

If you smell gas:

1. **Open windows**
2. **Don't touch electrical switches**
3. **Extinguish any open flames**
4. **Immediately call your gas supplier**

FOR YOUR SAFETY

Do not store or use gasoline or any flammable vapors and liquids in the vicinity of this or any other appliance.

CONSIGNES DE SECURITE

Si vous sentez une odeur de gaz:

1. Ouvrez les fenetres
2. Ne touchez pas aux interrupteurs electriques
3. Etegnex toute flamme hue
4. Contactez immediatement votre compangie de gaz

CONSIGNES DE SECURITE

Il es interdit d'utiliser des liquides inflammables ou degageant des vapeurs inflammables, a proximite de tout appareil fonctionnant au gaz

Retain Instructions For Future Reference

HIRED-HAND, INC. • 1733 County Road 68 • Bremen, AL 35033 USA• Phone 256-287-1000 • Fax 256-287-2000
Manual Part No. 4801-1006 Rev 7-05

Congratulations!

As the owner of a Super-Saver XL Heater, you gain the benefits of many years of experience and know-how that go into every Hired-Hand product. You also gain the satisfaction of owning the finest product of its kind, backed by the best guarantee in the industry.

We hope that you will be 100% satisfied with your appliance, and we welcome your suggestions and comments on how we can better serve your needs.

Hired-Hand, Inc.
1733 County Road 68
Bremen, AL 35033

Shawn Crider, President

⚠ GENERAL HAZARD WARNING

Failure to comply with precautions and instructions provided with this heater can result in death, serious bodily injury and property loss or damage from hazards of fire, explosion, burn, asphyxiation, carbon monoxide poisoning, and/or electrical shock. If you need assistance or heater information such as an instruction manual, labels, etc. contact the manufacturer.

⚠ WARNING

Keep solid combustibles, such as building materials, paper, cardboard, feathers, straw and dust a safe distance away from the heater as recommended by the instructions. Never use the heater in spaces which contain or may contain volatile or airborne combustibles, or products such as gasoline, solvents, paint thinner, dust particles, or unknown chemicals. Failure to follow these instructions may result in a fire or explosion, property damage, personal injury or loss of life.

⚠ WARNING

Not for home or recreational vehicle use. Installation of this heater in a home or recreational vehicle may result in a fire or explosion, property damage, personal injury or loss of life.

⚠ WARNING

Proper gas supply pressure must be provided to the inlet of the appliance. Refer to rating plate for proper gas supply pressure. Gas pressure in excess of the maximum inlet pressure specified at the appliance inlet can cause fires or explosions, leading to serious injury, death, building damage or loss of livestock.

Likewise, gas pressure below the minimum inlet pressure specified at the appliance inlet may cause improper combustion, leading to asphyxiation, carbon monoxide poisoning and therefore serious injury or death to humans and livestock.

USE OF EQUIPMENT

The intended use of this appliance is the heating of agricultural animal confinement buildings.

ELECTRICAL

The electrical connections and grounding of the appliance shall be in compliance with the National Electrical Code ANSI/NFPA 70.

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Be Sure To Check Delivery!

Locate packing slip and make sure all of the listed parts are enclosed. If not, call your Hired-Hand Distributor immediately.

HEATER DIMENSIONS	
WEIGHT	130 lb. (60 kg)
HEIGHT	30 in. (76.2 cm)
WIDTH	24-1/2 in. (62.2 cm)
DEPTH	19-1/4 in. (48.9 cm)



Adjustable Wrench

Gas Leak Testing Solution

Pipe Glue

1/4″ (7 mm)
Nut Driver

Install screw hooks with hammer or drill.

MINIMUM CLEARANCES

The heater must be located a minimum of 12 inches (305 mm) from the ceiling, a minimum of 12 inches (305 mm) from the wall on the sides and back, a minimum of 20 inches (305 mm) from the ground, and positioned such that livestock and combustible materials are unable to come in contact with the heater or within 10 feet (3 meters) of the hot air discharge. (See Figure 1 - Installation Instructions).

1. Specifications And Requirements

Model No.	Maximum Input	Ventilation (air required to support combustion)
SS-40-XL	**40,000 BTUH (11.7 kW)**	**500 CFM (849.5 m^3/hr)**
SS-75-XL	**75,000 BTUH (21.9 kW)**	**500 CFM (849.5 m^3/hr)**
SS-120-XL	**120,000 BTUH (35.2 kW)**	**1000 CFM (1699 m^3/hr)**
SS-175-XL	**175,000 BTUH (36.6 kW)**	**1000 CFM (1699 m^3/hr)**
SS-200-XL	**200,000 BTUH (58.6 kW)**	**1000 CFM (1699 m^3/hr)**
SS-225-XL	**225,000 BTUH (65.9 kW)**	**1000 CFM (1699 m^3/hr)**

LP/Propane Gas	Maximum 14 in. W.C. (34.8 mbar) and minimum 12.5 in. W.C. (31.1 mbar) inlet gas supply pressure acceptable at gas regulator connection. Burner manifold pressure 11 in. W. C. (27.4 mbar) at maximum input. Gas pressure should be checked by a certified gas technician while heater is in operation.
Natural Gas	Maximum 14 in. W.C. (34.8 mbar) and minimum 5 in. W.C. (12.5 mbar) inlet gas supply pressure acceptable at gas regulator connection. Burner manifold pressure of 3.5 in. W. C. (8.7 mbar) at maximum input. Gas pressure should be checked by a certified gas technician while heater is in operation.

Refer to heater ratings plate for unit voltage, amperage, and frequency ratings.

2. Warnings And Cautions

⚠WARNING

When Heater Is Connected To Remote Thermostat
Heater May Start At Any Time!

ELECTRICAL GROUNDING INSTRUCTIONS

This appliance is equipped with a three prong (grounding) plug for your protection against electrical shock and should be plugged directly into a properly grounded three-prong receptacle. Failure to use a properly grounded receptacle can result in electrical shock, personal injury or death.

CAUTION!

1. Installation must conform with local, state, and national codes, or in the absence of local codes, with the *Standard for the Storage and Handling of Liquefied Petroleum Gases*, in accordance with ANSI/NFPA 58 and/or the *National Fuel Gas Code*, ANSI Z223.1, as applicable.
2. Follow safety, maintenance, and test firing instructions packaged with Heater.
3. Refer to model specifications label for gas type (LP or Natural Gas).
4. Check all connections for gas leaks.
5. Gas supply and regulator must be installed outside building.
6. The hose assembly should be protected from traffic, building materials, and any contact with hot surfaces both during and while in storage.
7. Do not open heater doors, or remove a heater panel, or move or handle the heater while it is operating, hot, or connected to power supply.
8. Turn power off before servicing. (Heater may start at any time if power is connected).
9. Heater is not recommended for heating human living quarters.
10. Not to be used for heating where flammable liquids and vapors are stored or used.
11. Inadequate gas volume and (or) pressure will directly influence the combustion efficiency of the heater. Adequate gas volume and (or) pressure is the responsibility of the installer.
12. Adequate ventilation is required.
13. Combustion and ventilation air must not be obstructed.
14. Not for use with duct work other than types provided by manufacturer.
15. Position heater properly before use. Heater must be level and in accordance with minimum clearances.
16. For safety, this heater is equipped with air flow proving switch and manual-reset high limit switch.
17. Keep temperature of fuel containers below 100° F (37.8°C) . Containers must be installed outside building.
18. Heater must not be operated for one hour following wash-down.

3. Maintenance And Warranty

MAINTENANCE

1. The appliance area should be kept clear & free from combustible materials, gasoline and other flammable vapors, and liquids.
2 The flow of combustion and ventilation air must not be obstructed.
3. Your Super Saver XL Heater should be inspected before each use, and at least annually by a qualified service person.
4. The hose should be visually inspected prior to each use of the heater. If it is evident there is excessive abrasion or wear or the hose is cut, it must be replaced prior to the heater being put into operation. The replacement hose assembly shall be that specified by the manufacturer. (See parts list).
5. Inspect heater and gas connections periodically for gas leaks with an approved gas leak testing solution; applying a soapy water mixture to gas connections works well. Bubble formation indicates a leak.
6. Keep heater clean at all times.
   - A. Open doors and blow out dust with high pressure air hose. Be sure interior of burner and flared end are kept clean.
   - B. Burner orifice and hot surface ignition assembly must be kept clean and free of carbon build-up.
   - C. Check blower wheel regularly for dust accumulation and clean periodically for maximum airflow.
   - D. Thermostat coils must be kept clean to assure proper temperature control.
   - E. Igniter must be cool before wash down. Do not operate heater for one hour following wash-down.

WARRANTY

Your Super-Saver XL Heater has been manufactured with the finest materials and components available, and is backed by a one-year warranty against electrical and mechanical defects in material and workmanship. If this heater fails to operate during this period, return it intact and prepaid to Hired-Hand, Inc., 1733 Co Rd 68, Bremen, AL 35033 for repair or replacement without charge at the manufacturer's option.

Damage by accident or abuse is not covered by this warranty.

This warranty gives you specific legal rights.

You may also have other rights which vary by location.

Warrantor: Hired-Hand, Inc. Bremen, AL 35033 USA

DISCLAIMER

This appliance rating is based on the use of ANSI LC-2 test gases including LP (2500 BTU/ft^3, 93.15 MJ/m^3) and natural gas (1075 BTU/ft^3, 40 MJ/m^3). Hired-Hand, Inc. makes no guarantees regarding the proper operation of this appliance when these conditions are not met.

4. Installation

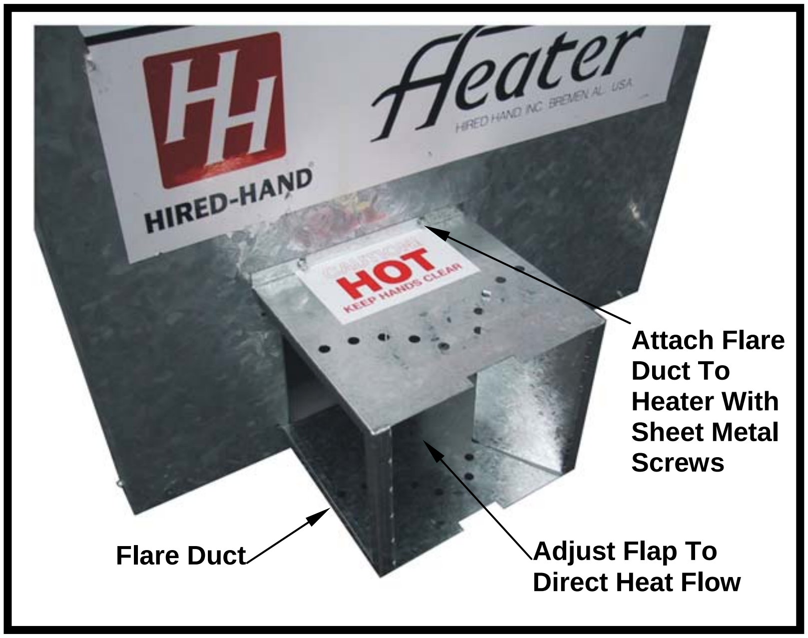
4.1 *Hanging The Heater*

Chain Suspension	Cable Suspension
Mount the heater with screw hooks and chains so that the back of the heater is at least 12 inches (305 mm) from the ceiling and wall. The heater must be a minimum of 20 inches (500 mm) from floor, and located so that livestock and combustible materials are unable to come in contact with heater or within 10 ft (3 meters) of the hot air discharge.	If frequent height adjustment is required, use cables and pulleys. Main line cable would be connected to a winch.

4.2 *Directions For Leveling*

Adjust cables or chains as required to level the heater. Use a carpenter's level to check that the heater is level.

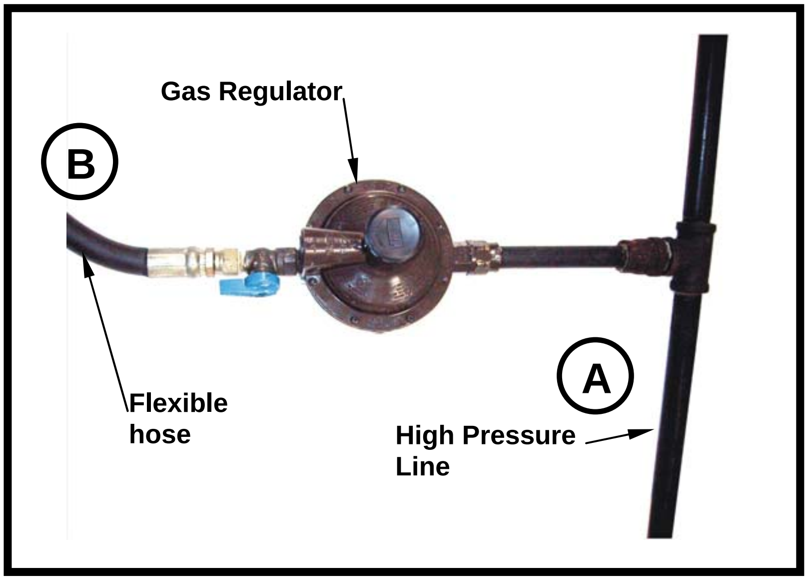
Fig. 1



4.3 *Installing Dual-Flare Duct*

Fold Dual-Flare duct to shape as shown in Fig. 1. Install Dual-Flare duct to heater exhaust (Fig. 1) as shown with sheet metal screws provided. This provides a multi-directional heat flow that may be set by bending flaps.

Fig. 2



4.4 *Connecting The Gas Supply*

For gas connection (Fig. 2) attach regulator to the Hi-Pressure Line (A) at outside of building. Connect flexible hose (B) to low pressure end of regulator with special brass coupling. See page 1 for LP, and natural gas requirements.

5. User Instructions

Before turning on gas, check main supply valve to be sure it is open (Fig. 3). Be sure to check all connections for leaks with a Gas Leak Testing solution, (soap and water work well). Check to see if gas valve knob is in the ON position. If not, turn counter-clockwise until knob “clicks” into the ON position. (This may not apply to all units). Turn on gas by turning ball valve handle into vertical position.

5.1 Connecting Electrical Power

Make sure a circuit breaker or similar cutoff device is provided to permit disconnection of electrical power to heater for service and cleaning. This heater is designed to be wired directly, with no plugs and outlets necessary. All electrical work should be performed by a certified electrician. The wiring diagrams on pages 7-8 show how to wire a line power supply directly to the heater’s terminal block. If no adjustments are made, the heater will operate every time power is supplied and the on/off switch is activated. If an external thermostat is to be used (See Component & Wiring Diagram), the heater will operate only when power is supplied, the on/off switch is activated, and the thermostat indicates a call for heat.

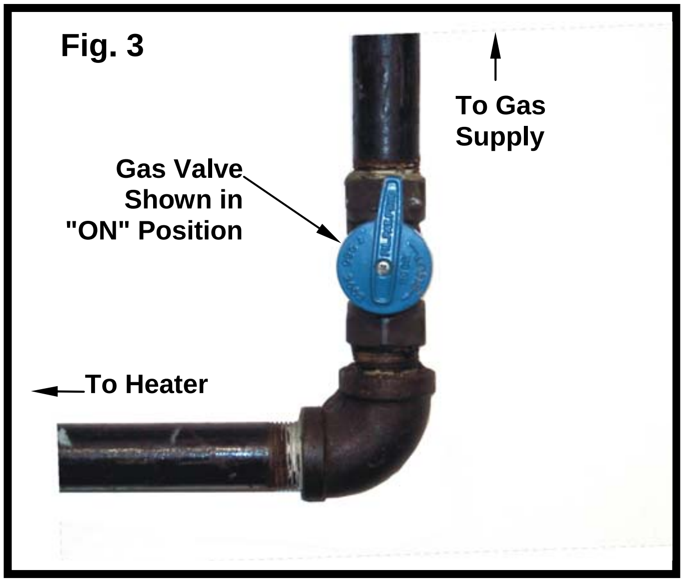
5.2 Starting Up

Adjust thermostat higher than house temperature. Allow 20 seconds for heater to ignite. On initial start up or when heater has not been in service for some time, heater may require more than one attempt to purge air and ignite heater. (IF HEATER FAILS TO IGNITE. REFER TO TROUBLE SHOOTING GUIDE). Adjust thermostat to desired house temperature.

5.3 Shutting OFF Heater

Shut off main gas supply valve, close ball valve, and disconnect electrical power.

Fig. 3



CAUTION!

LIMITING EXCESS CARBON DIOXIDE (CO_2)

In order to prevent hazardous accumulation of CO_2 gases, the heater must operate ONLY in a properly ventilated room.

Ventilation requirements are given in 'Specifications and Requirements' on page 1.

Both installer and operator must ensure that the building’s ventilation rate never drops below the noted limits.

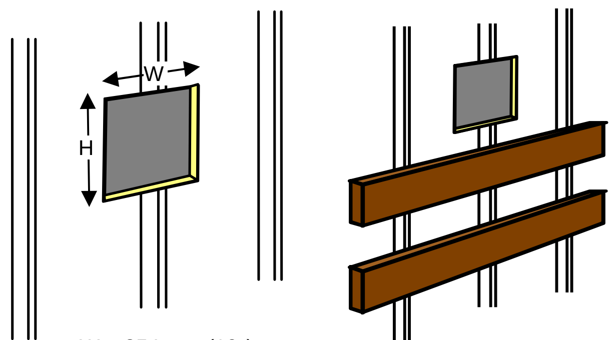
6. Outside Mount (Optional)

Hired-Hand heaters are available in Outside Mount (OSM) models. These heaters are designed to be mounted to the outside wall of a building. This saves valuable space inside the building and ensures fresh air intake for the heater. If you have purchased one of our OSM heaters, please read the following before installing your new heater.

1. Before disposing of the box, cut the installation template from the side.
2. Position template on outside of building where heater is to be mounted. Be sure the template is level.
3. Drill 6.3 mm (1/4″) holes through all 8 X's shown on template. NOTE: Opening for duct measures 254 mm (10″) width (W) x 254mm (10″) height (H). See Detail A.
4. Locate 4 X's for thru-wall extension duct and cut from one hole to the next until opening is removed. See Detail A.
5. If additional support is needed, add support by fastening two 2' x 4' boards on outside of wall where heater support brackets are to be positioned. The two 2' x 4' boards are to be fastened to studs inside the wall. See Detail B.
6. Assemble heater support bracket as shown in Detail C.
7. Attach Insert thru-wall extension duct assembly through opening in wall. The 'varmint' flap, located inside the thru-wall extension duct, should be positioned as shown in Detail D.
8. Bend extension duct mounting flange into a rectangle and fasten around exhaust outlet on front of heater with sheet metal screws provided.
9. Place heater on support bracket. Support bracket must be level before heater is set in place.
10. Slide thru-wall extension duct assembly into flange, and secure with sheet metal screws.
11. Place outer flashing seal around thru-wall extension duct and secure with sheet metal screws to inside of wall.
12. Fasten directional duct to extension duct mounting flange, then bend deflectors until they force heated air in the desired direction.
13. To continue with installation of your heater, see 'User Instructions' section on the next page.

Detail A

Detail B

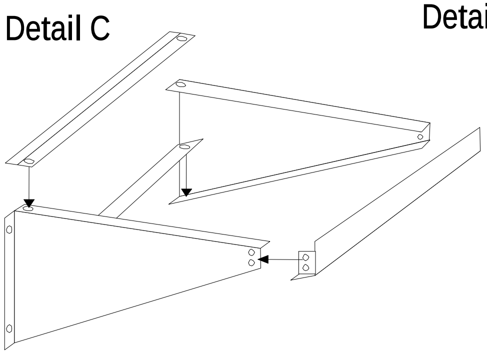


W = 254 mm (10″)
H = 254 mm (10″)

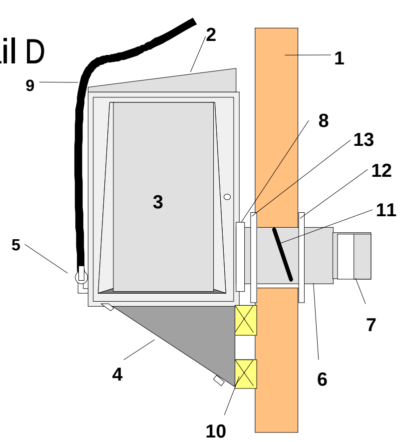
CAUTION!

The minimum side clearance to combustible walls must be 305 mm (12 inches).
The minimum clearance between the appliance and rear wall must be 305 mm (12 inches).
Weeds, snow, or other materials must not be allowed to accumulate on heater or adjacent to heater. Heater and thru-wall extension duct must be a minimum of 500 mm (20 inches) above ground and out of reach of livestock.

Detail C



Detail D

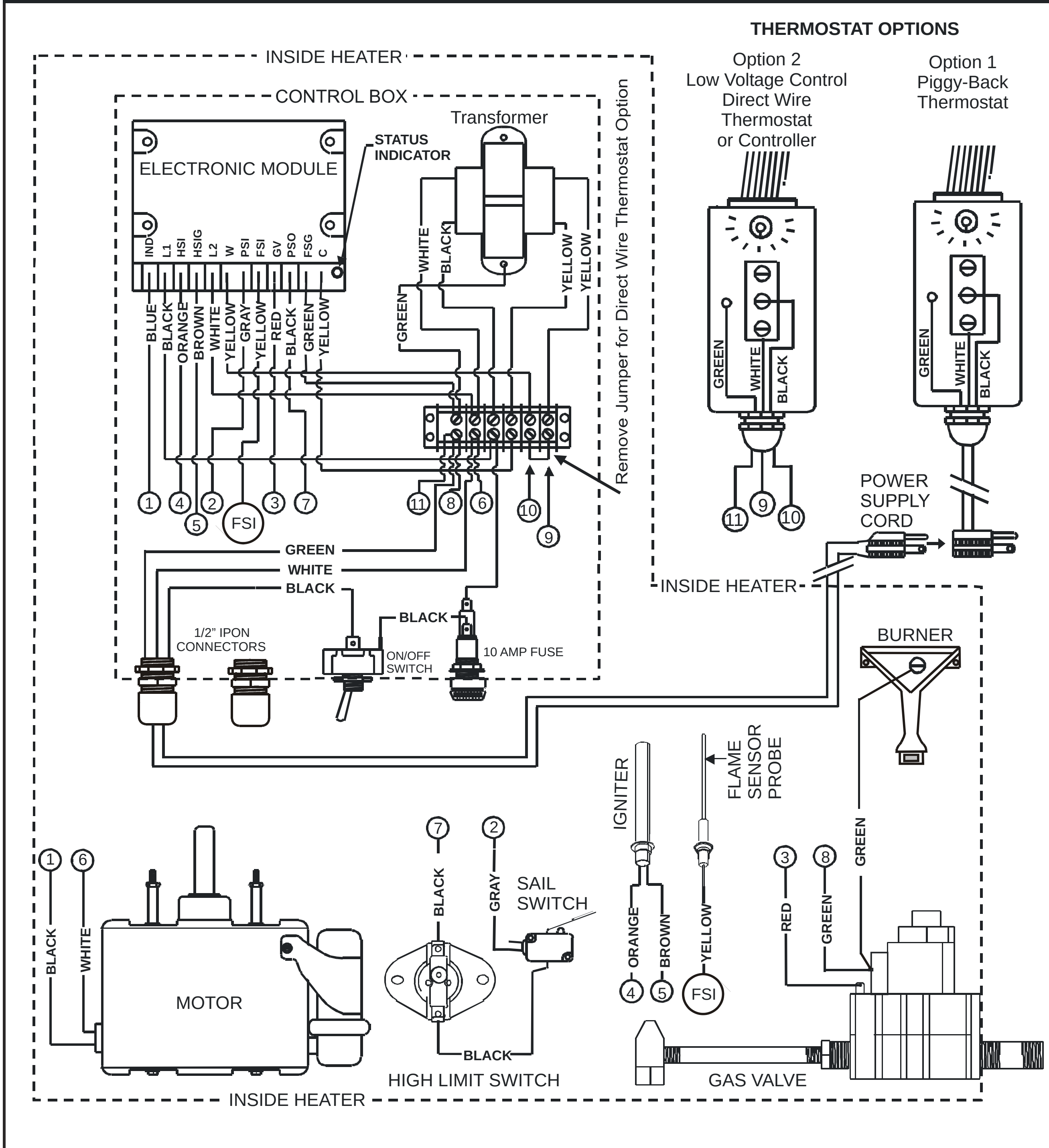


Legend

1. Wall (By others)
2. Rain shield, included with OSM heater.
3. Door, included with OSM heater.
4. Mounting brace, included with OSM kit.
5. Gas shutoff valve, included with heater.
6. Thru-wall extension duct, included with OSM kit.
7. Dual flare duct. Use T-duct included with heater or use optional OSM Y-duct ordered separately.
8. Extension flange, included with OSM kit.
9. Gas hose, optional ordered separately.
10. 2 x 4 Framing for Brace, not included
11. 'Varmint' flap, included with OSM kit.
12. Inner flashing seal, included with OSM kit.
13. Outer flashing, included with OSM kit.

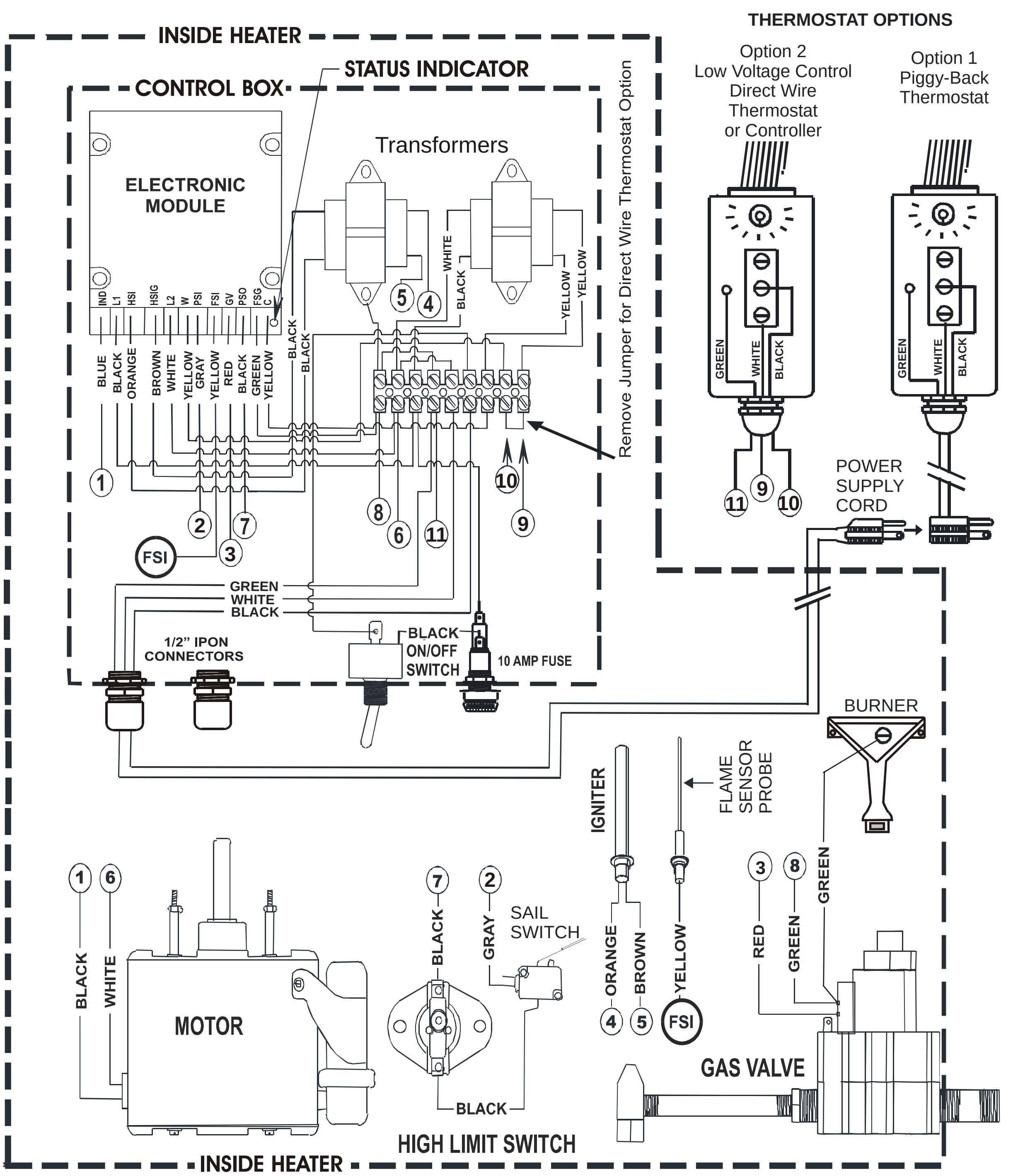
7. Component and Wiring Diagram

COMPONENT AND WIRING DIAGRAM



120 Volts A.C. 50/60 Hz Single Phase

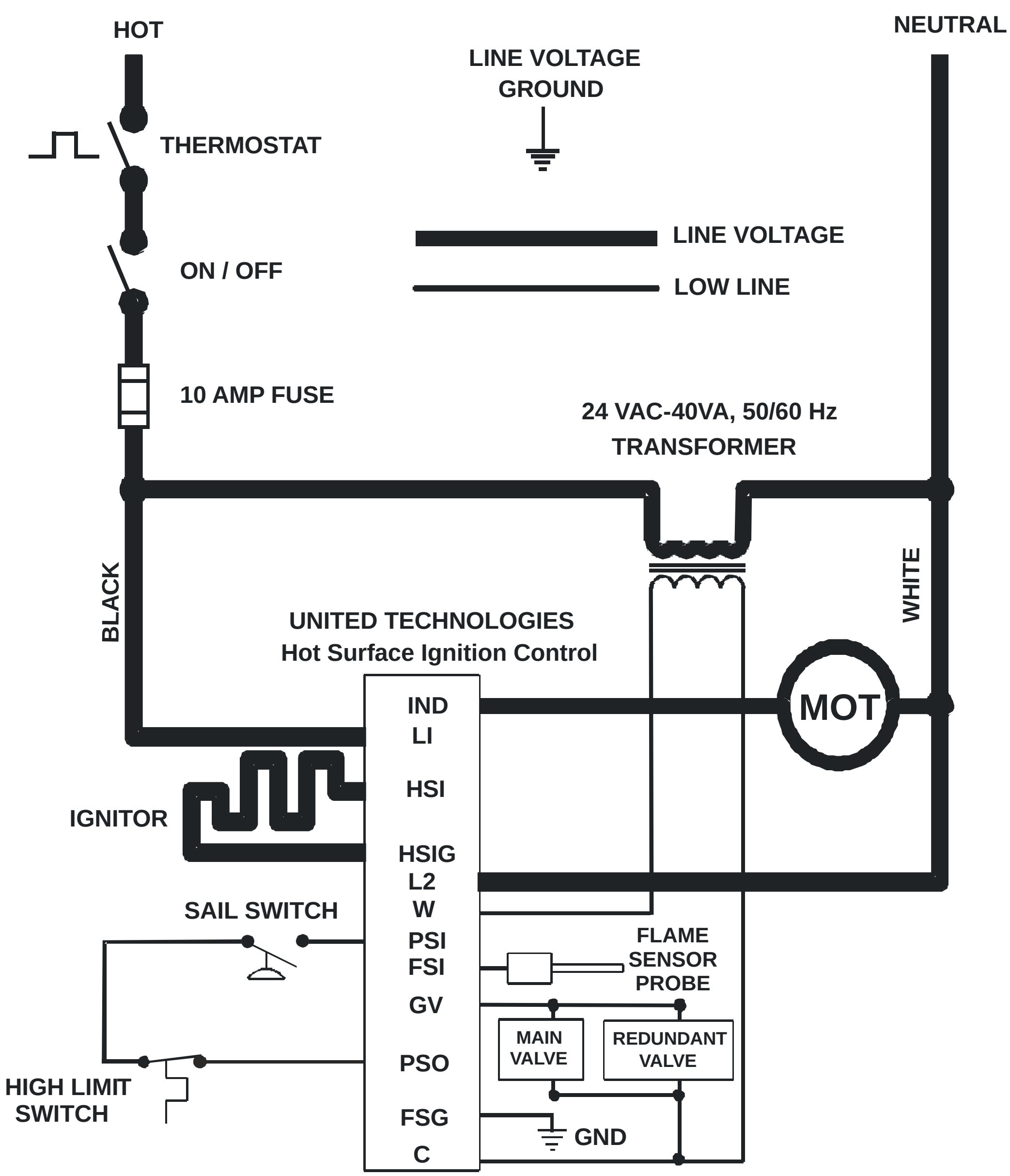
COMPONENT AND WIRING DIAGRAM



240 Volts A.C. 50/60 Hz Single Phase

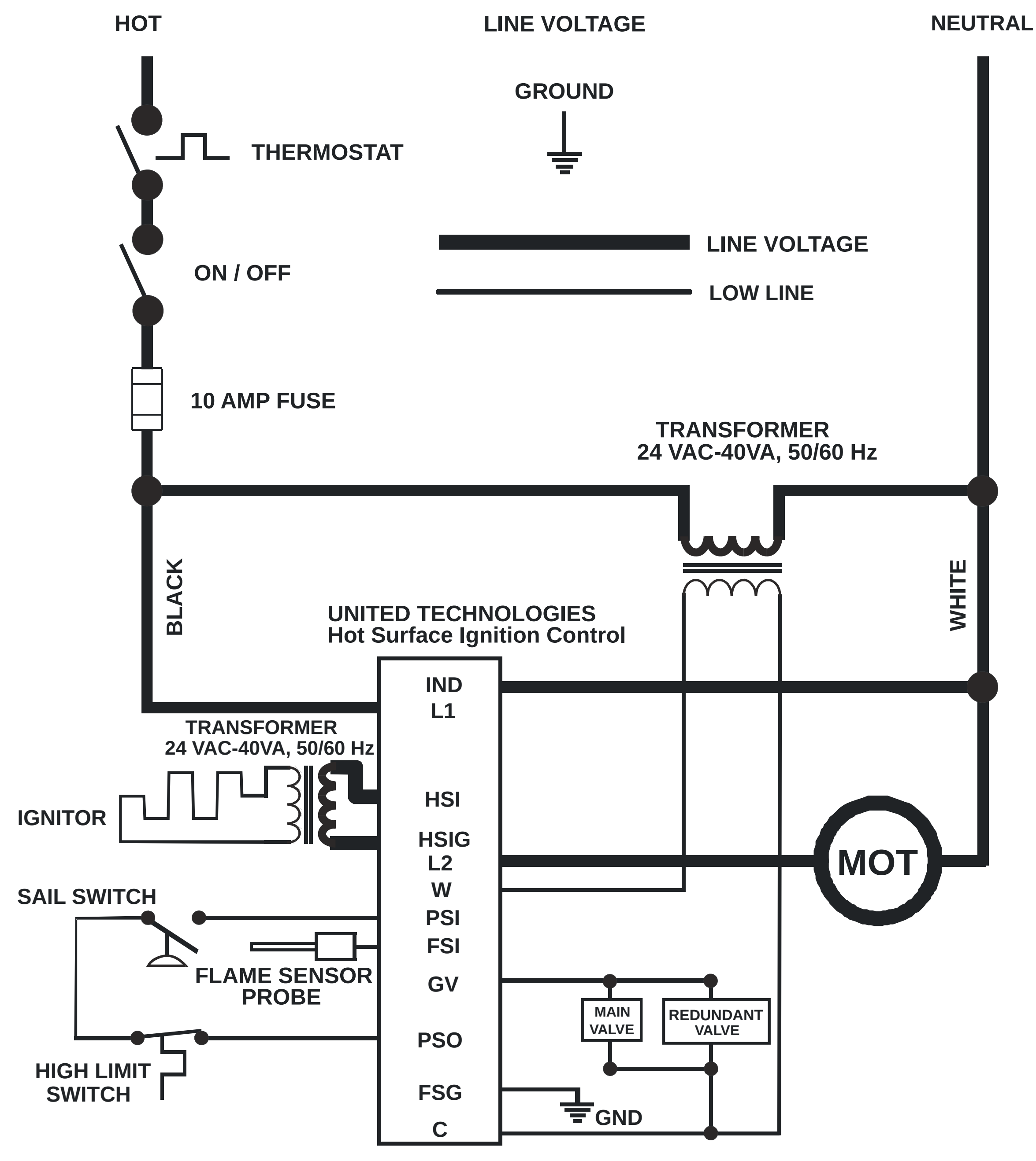
8. Ladder Type Schematic Diagram

LADDER TYPE SCHEMATIC DIAGRAM



120 Volts A.C. 50/60 Hz Single Phase

LADDER TYPE SCHEMATIC DIAGRAM



240 Volts A.C. 50/60 Hz Single Phase

9. Servicing Instructions

9.1 United Technologies Hot Surface Ignition System

IMPORTANT!

Inspect and check operation of this appliance monthly. Follow the instructions below. If a problem is detected, contact a qualified technician to make any necessary repairs.

In an effort to minimize the time required to trouble shoot this system:

1. Turn off the gas supply at the main gas valve.
2. Disconnect electric power to system at main fuse of circuit breaker, if connected.
3. Visually inspect equipment for apparent damage. Check wiring for loose connections.
4. Inspect igniter for visible cracking or scale deposits. Inspect flame sensor for position or deposits shorting sensor to burner.
5. After performing the above inspections, restore gas supply, and electric power to the equipment. Close thermostat contacts to cycle the system. If a "no heat" condition persists, the three visual indicators listed below will help determine if system is operating properly.

[1] The igniter will warm up and glow bright red.

[2] The main burner flame will ignite.

[3] The main burner flame will continue to burn after the igniter is turned off.

Trouble shooting the system consists of checking for these three visual indications. The Visual Check Charts define the proper action if any of these indications do not occur.

DANGER!

DO NOT OMIT THIS STEP WHEN TROUBLESHOOTING THE APPLIANCE

Line voltage (120 VAC or 240 VAC) could be present on the surface of the igniter if the system is not correctly wired. Such voltage can cause death or serious injury.

1. Disconnect electric power to system at main fuse or circuit breaker.
2. Remove draft shield (if necessary) to gain access to the igniter.
3. Disconnect the igniter socket from the wiring harness.
4. Connect an AC voltmeter across the terminal connected to the white wire and the chassis ground, and then reconnect electric power to the system.
5. If voltage exists between the terminal connected to the white wire and the chassis ground, the main power supply lines are improperly connected to the furnace. Reverse incoming line voltage leads.

9.2 1018 Series Hot Surface Ignition

Status Indicator Error Conditions

The status indicator LED will not be lit with power applied to the board and the control operating properly. However, if the control is not operating properly, the status indicator LED will flash in one of the following error codes.

1. Status Indicator Flashing One Time

When the status indicator LED shows the error code of a single repeated flash, the control is in lock-out, because the sail switch was stuck closed.

2. Status Indicator Flashing Two Times

When the status indicator LED shows the repeating error code of two flashes, the control is in lock-out because the control circuits did not receive the "closed" signal from the high limit switch and the sail switch within the required amount of time.

3. Status Indicator Flashing Three Times

When the status indicator LED shows the repeating error code of three flashes, the control is in lock-out due to either a failed ignition attempt, a gas valve error, or a false flame sensed during the pre-purge of warm-up periods. If false flame has been sensed, the control will return to normal operation, and begin a new ignition sequence when the false flame is no longer present.

4. Status Indicator Flashing Four Times

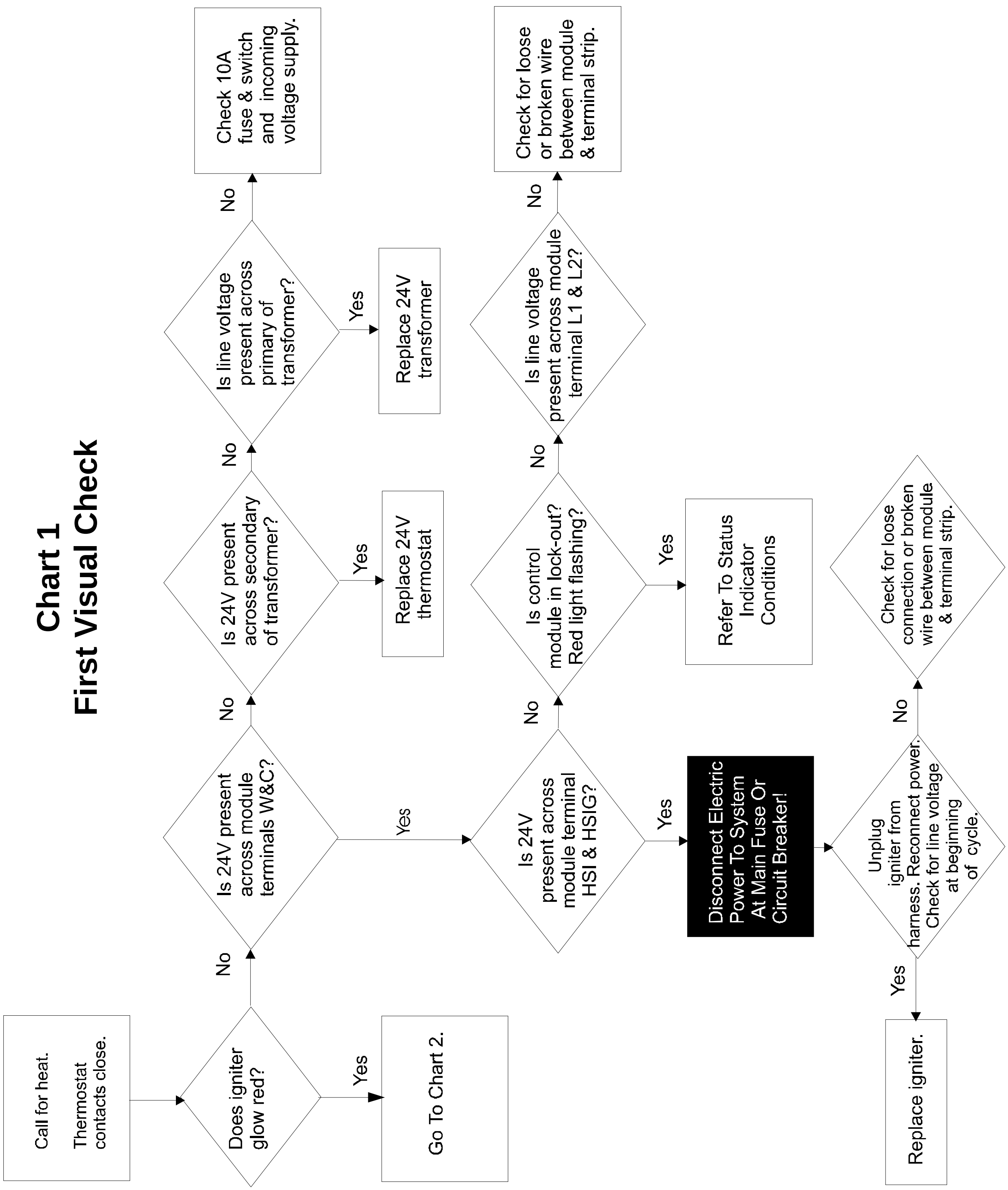
When the status indicator LED shows the repeating error code of four flashes, the control has gone into lock-out due to a failure within the control board.

9.3 Checking Manifold Pressure

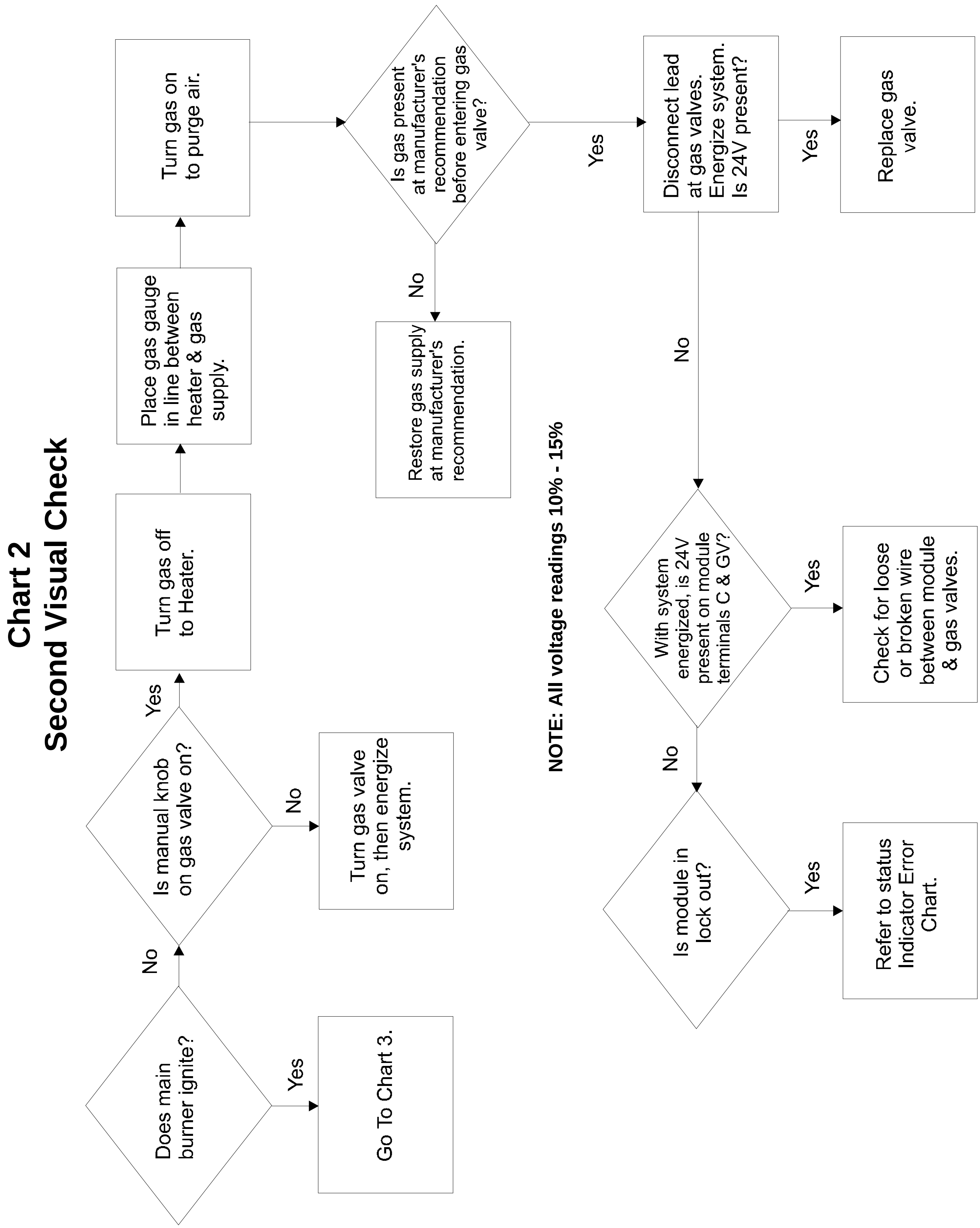
To be performed by a certified gas technician only!

1. Unplug heater from power source and turn ball valve to OFF position.
2. Remove outlet pressure tap plug from gas control valve and connect pressure gauge.
3. Return electrical power to heater and plug to power source and turn ball valve to ON position.
4. To obtain an accurate manifold pressure reading, heater must be cycled on and off several times to stabilize the pressure regulator diaphragm.
5. Return the heater to operation and read pressure gauge.
6. If necessary, adjust pressure regulator on gas control valve to the acceptable manifold pressure found on rating plate and page 1 of owner's manual.
7. Remove pressure regulator adjustment screw.
8. Using a screwdriver, turn inner adjustment screw clockwise to increase or counter clockwise to decrease manifold pressure to burner.
9. Always replace cap screw and tighten firmly to prevent gas leakage.
10. Unplug heater from power source and turn ball valve to OFF position.
11. Remove pressure gauge and replace outlet pressure tap plug.
12. Return heater to operation and observe through at least one complete cycle to ensure all controls are operating properly.
13. Perform gas leak test at outlet pressure tap plug. (Soap and water work well).

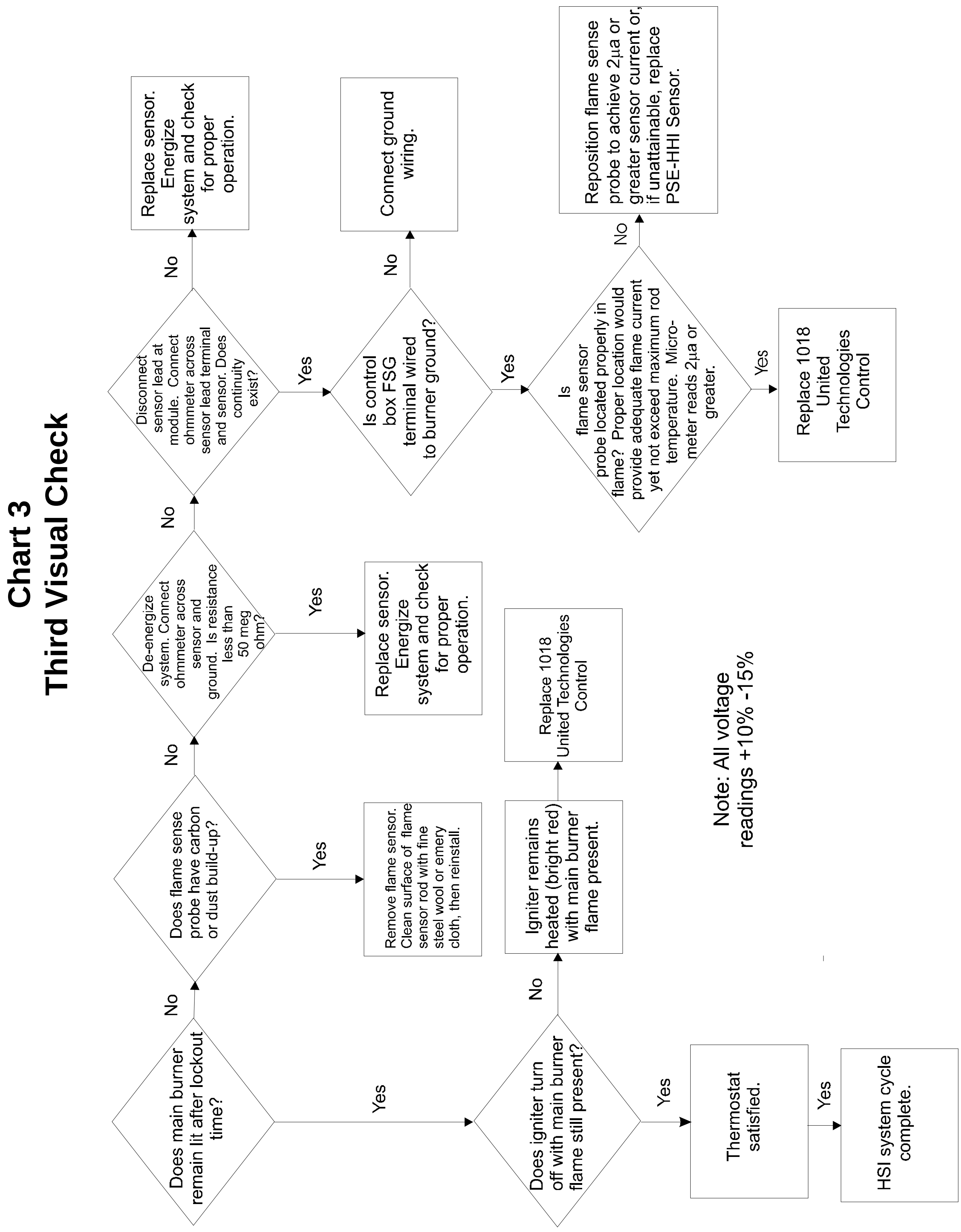
9.4 Chart 1 First Visual Check



9.5 Chart 2 Second Visual Check



9.6 Chart 3 Third Visual Check



10. Pipe Sizing Guidelines

10.1 Calculating HVR & ELOP

1. Using a system schematic, label each piping section of the system starting at the meter or regulator. A different pipe section starts where the gas demand of the system changes, usually at a junction.
2. Determine the Heating Value Required (HVR) in BTUH (BTU's per hour) for each section of pipe.

   HVR = (no. heaters supplied by pipe section) X (heat output per heater)

3. Determine the Equivalent Length Of Pipe (ELOP) required for sufficient gas service.

   ELOP = (length from meter to most remote heater) + (Minor loss equivalents of the system)

   IMPORTANT: Use the ELOP value from this equation for size determination of all pipe sections.

4. Use the ELOP value from step 3, and the HVR of each pipe section to determine the required pipe size for either natural gas (NG) (Table 1) or liquid propane (LP) (Table 2) from the table 'Maximum Capacity Of Pipe'.

10.2 Directions For Reading Pipe Size From Tables:

EXAMPLE: Four 40,000 BTUH (12 kW) heaters will be installed on the gas pipe line in the 'Arbitrary Piping System' diagram below. NOTE: Values given in English and Metric equivalent units.

1. Determine the HVR value for each pipe section of the system.

Pipe Section	No. Of Heaters	HVR Calculation		HVR Value	
		BTUH	kW	BTUH	kW
a-b	4	4 x 40,000	4 x 12	160,000	48
b-c	2	2 x 40,000	2 x 12	80,000	24
c-e	1	1 x 40,000	1 x 12	40,000	12
b-d	1	1 x 40,000	1 x 12	40,000	12
b-f	1	1 x 40,000	1 x 12	40,000	12
c-g	1	1 x 40,000	1 x 12	40,000	12

2. Determine the ELOP. Length from meter to most remote heater = length from a to e (or g) = 100ft (30m) + 25ft (8 m) = 125ft (38 m) Minor loss equivalents from Table 1 = 1 gate valve x 2ft/valve (1 m/valve) + 3 tees x 11 ft/tee (4 m/tee) =35ft (13 m). Calculated ELOP = 125ft (38 m) + 35ft (13 m) = 160 ft (51 m) Tabulated ELOP = 200ft (60 m) Round up to the nearest table value.

3. In the appropriate table, NG (Table 2) or LP (Table 3), select the column showing the ELOP or the next longer length, if the table does not give the exact length. Use this column to compare table values to the HVR values. Use the Natural Gas table (Table 2) in this example. From step 2, ELOP = 200ft (60 m) Locate the column labeled 200ft (60 m) in Table 2.

4. Select a pipe section and read down the ELOP column to find the maximum gas capacity that matches the HVR for that particular pipe section. If the exact value is not listed, choose the next larger value in the column. In this example, start with pipe section c-e. For pipe section c-e, HVR = 40,000 BTUH (12 kW). From Table 2, column 200 ft, 40 (12) is not listed (NOTE: The table values are in thousands of BTUH's). The next larger value of 72 (21) is read from the table, corresponding to 72,000 BTUH (21 kW).

5. Follow the row leftward until you reach the columns labeled 'Internal Diameter' and 'Nominal pipe size'. Read the pipe size for the particular pipe section. For example, for pipe section c-e, the pipe size is ¾ inch (0.824 in.) (19.1 mm). Repeat for each pipe section.

Arbitrary Piping System

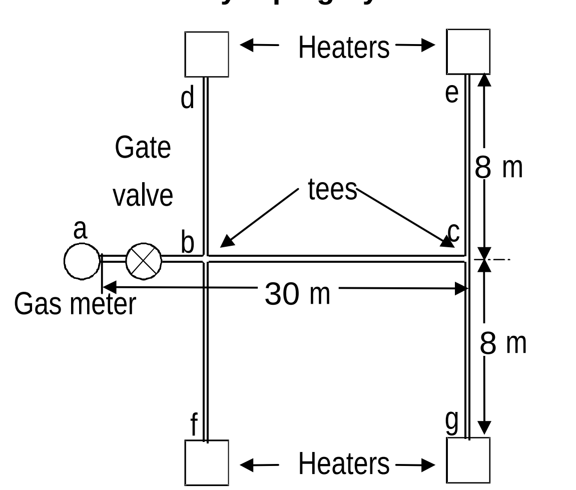


Table 1 Minor Loss Equivalents				
Fitting	2" (5.08 cm) IPS Or Smaller		2” (5.08 cm) IPS To 4” (10.16 cm) IPS	
	Feet per fitting	Meters per fitting	Feet per fitting	Meters per fitting
45° Elbow	1	1	5	2
90° Elbow	2	2	10	3
Tee	4	4	20	6
Gate Valve	1	1	3	1
Angle Valve	9	9	60	18
Swing Valve	5	5	30	9

Pipe Sizes Determined For Diagram				
Pipe Section	Max Gas Capacity Value Determined From Table 2		Pipe Size Determined From Table 2	
	BTUH	kWh	inches	mm
a-b	280,000	82	1-1/4 in	31.8
b-c	135,000	40	1 in	25.4
b-d	72,000	21	¾ in	19.1
b-f	72,000	21	¾ in.	19.1
c-e	72,000	21	¾ in.	19.1
c-g	72,000	21	¾ in .	19.1

IMPORTANT
Tables 2 and 3 are based on values given in the Gas Engineers Handbook and are intended as a guide only. Consult your gas supplier for gas capacity and pipe size information for your particular piping system.

Table 2. Maximum Capacity Of Pipe In Thousands Of BTU per Hour
Natural Gas (Methane) @ Pressure Drop Of 0.5 in w.c. (0.2 mbar)
Values listed are for 0.6 sp.gr. based on Heat Of Combustion of 1000 BTU/cu .ft

Nominal Iron Pipe Size, Inch*	Internal Diameter, (IPS) Inch*	Length Of Pipe, Feet (multiply ft by 0.3 to convert to meter)													
		10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**150**	**200**	**250**	**300**
1/2	.622	175	120	97	82	73	66	61	57	53	50	40	35	29	25
3/4	.824	360	250	200	170	151	138	125	118	110	103	84	72	59	53
1	1.049	680	465	375	320	285	260	240	220	205	195	160	135	109	100
1-1/4	1.380	1400	950	770	660	580	530	490	460	430	400	325	280	219	206
1-1/2	1.610	2100	1460	1180	990	900	810	750	690	650	620	500	430	325	309
2	2.067	3950	2750	2200	1900	1680	1520	1400	1300	1220	1150	950	800	614	596
2-1/2	2.469	6300	4350	3520	3000	2650	2400	2250	2050	1950	1850	1500	1280	966	950
3	3.068	11000	7700	6250	5300	4750	4300	3900	3700	3450	3250	2650	2280	1855	1680
4	4.026	23000	15800	12800	10900	9700	8800	8100	7500	7200	6700	5500	4600	3783	3432

Table values given in BTUH/1000. To convert to kW, multiply table values by 0.3
* 1 inch = 25.4 mm

Table 3. Maximum Capacity Of Pipe In Thousands Of BTU per Hour
Liquid Propane (LP) @ Pressure Drop Of 0.5 in w.c.
Values listed are for 1.6 sp.gr. based on Heat Of Combustion of 2500 BTU/cu .ft

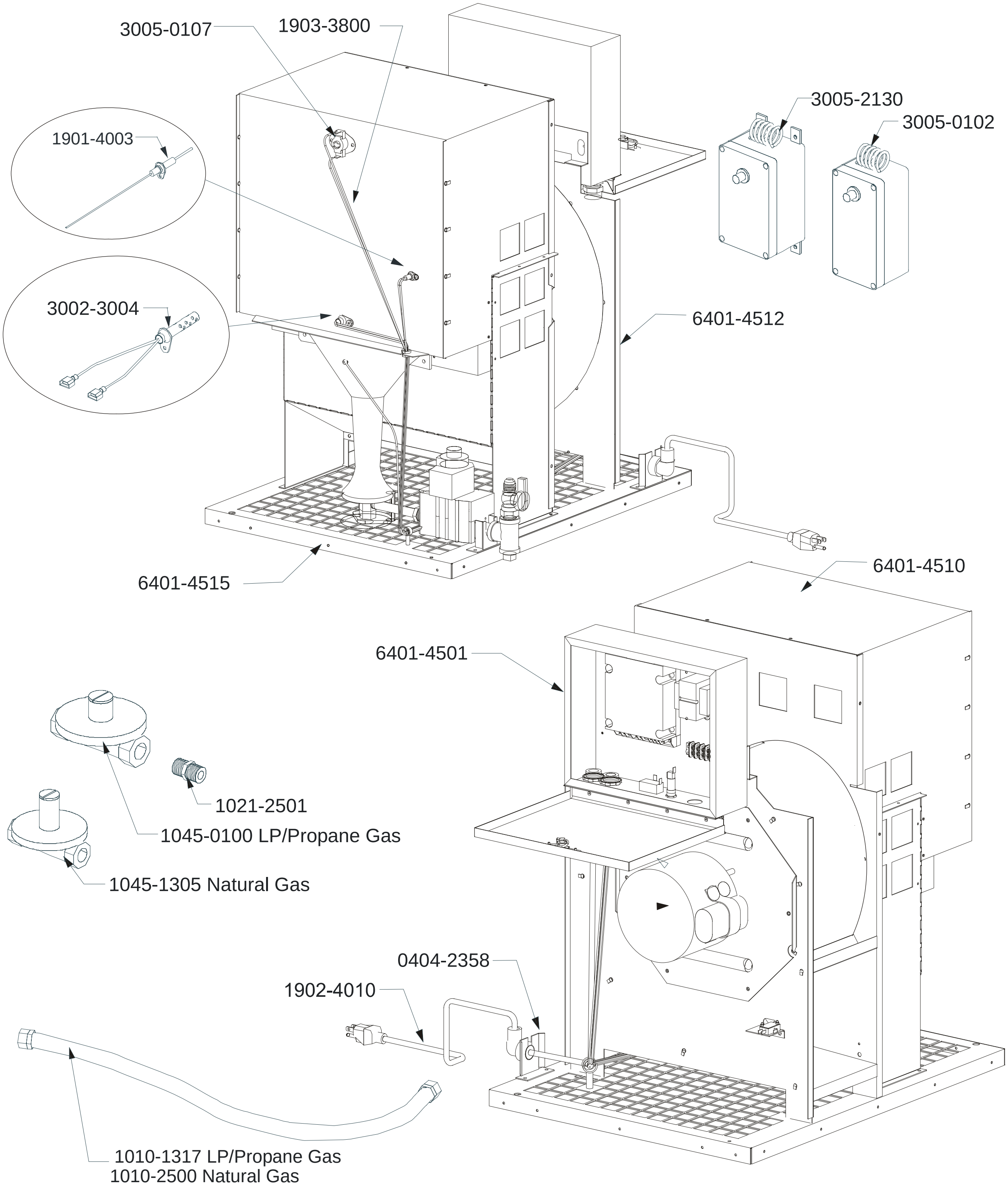
Nominal Iron Pipe Size, Inch*	Internal Diameter, (IPS) Inch*	Length Of Pipe, Feet (multiply ft by 0.3 to convert to meter)											
		10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**125**	**150**
1/2	.622	275	189	152	129	114	103	96	89	83	78	69	63
3/4	.824	567	393	315	267	237	217	196	185	173	162	146	132
1	1.049	1071	732	590	504	448	109	378	346	322	307	275	252
1-1/4	1.380	2205	1496	1212	1039	913	834	771	724	677	630	567	511
1-1/2	1.610	3307	2299	1858	1559	1417	1275	1181	1086	1023	976	866	787
2	2.067	6221	4331	3465	2992	2646	2394	2205	2047	1921	1811	1606	1496

Table values given in BTUH/1000. To convert to kW, multiply table values by 0.3.
* 1 inch = 25.4 mm

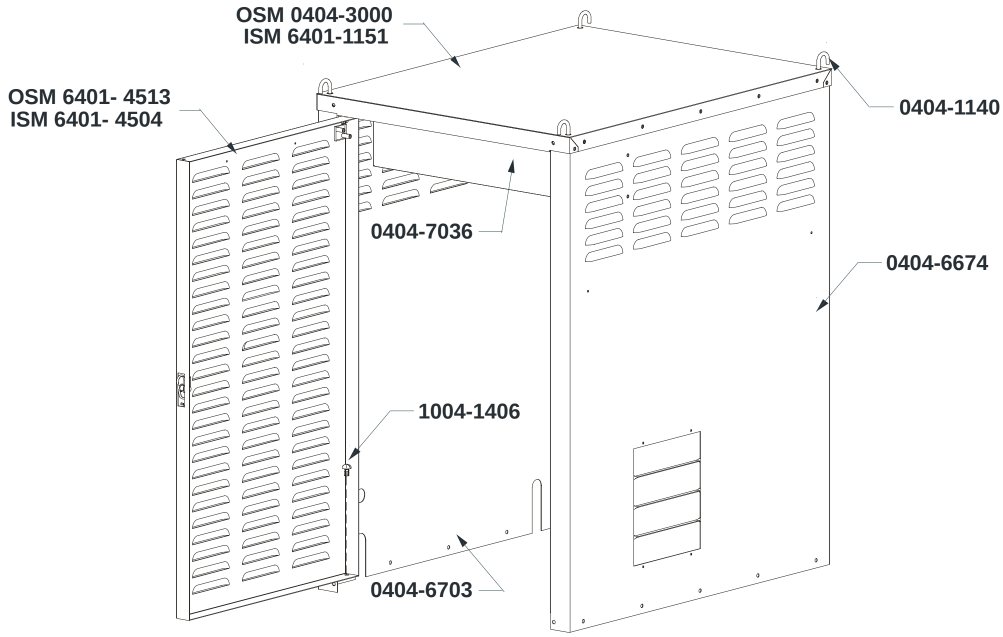
11. Parts & Assemblies

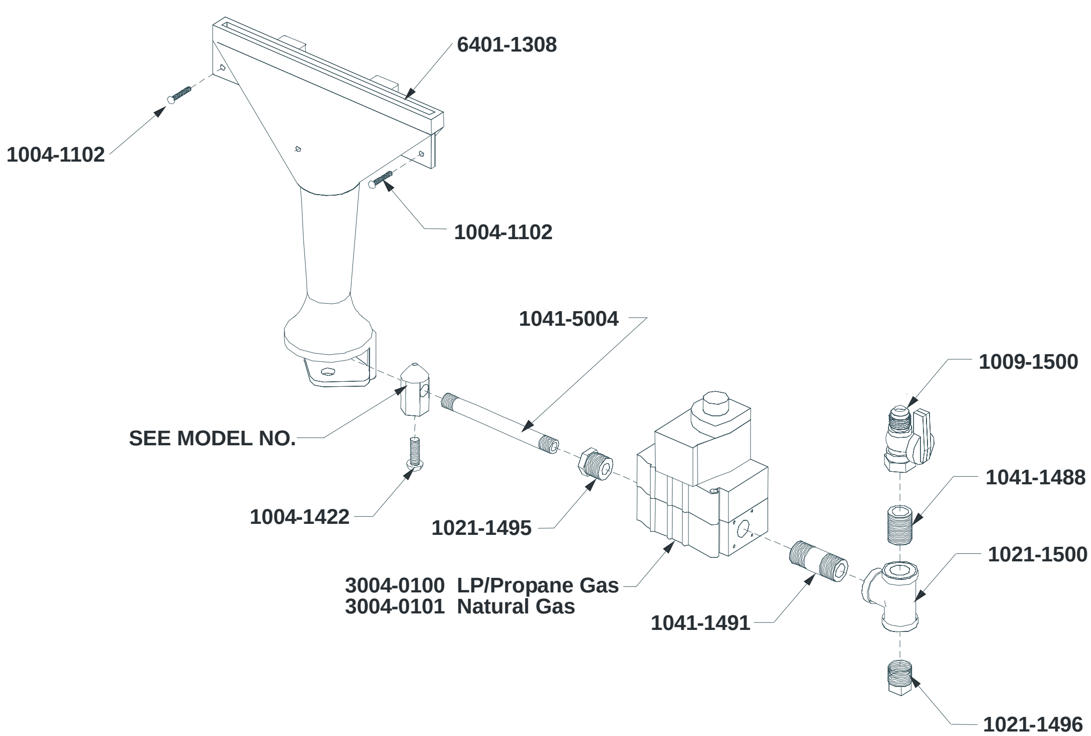
When ordering service parts, please specify the country, model number, date of manufacture, voltage, frequency, gas type, inside or outside mount, and whether the heater is constructed of galvanized or stainless steel.

Models SS-225-XXL, SS-200-XL, SS-175-XL, SS-1290-XL

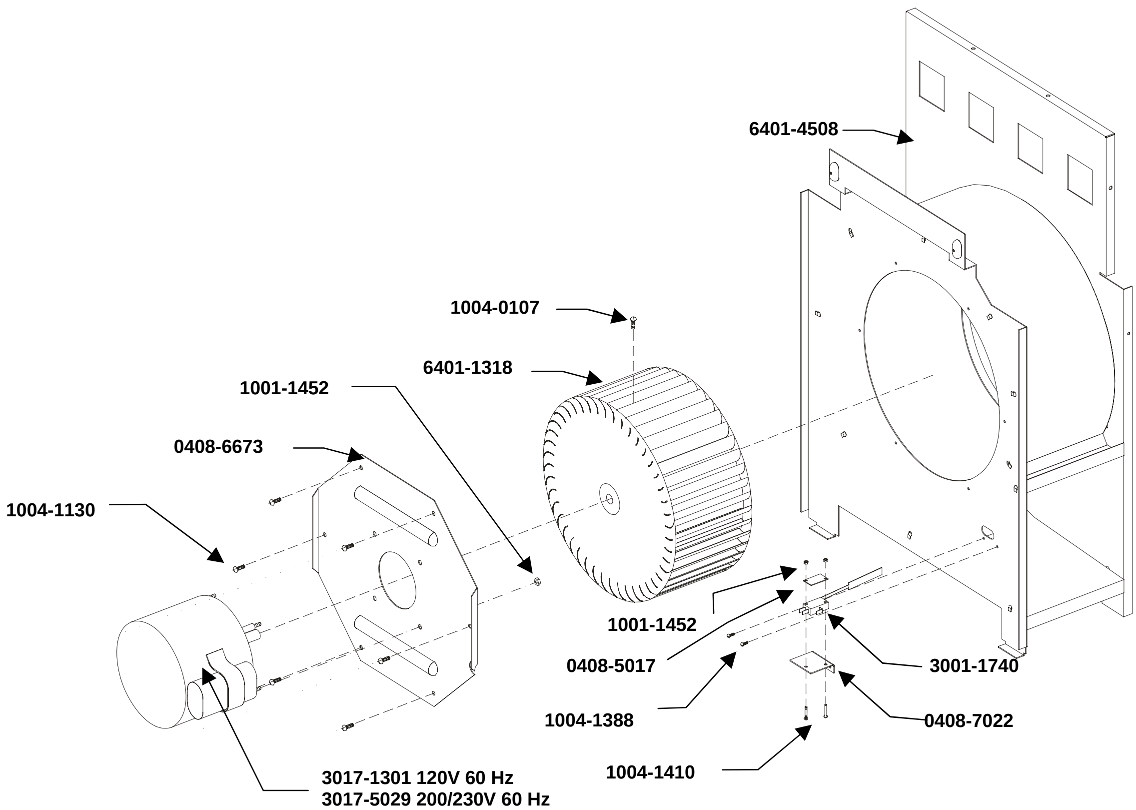


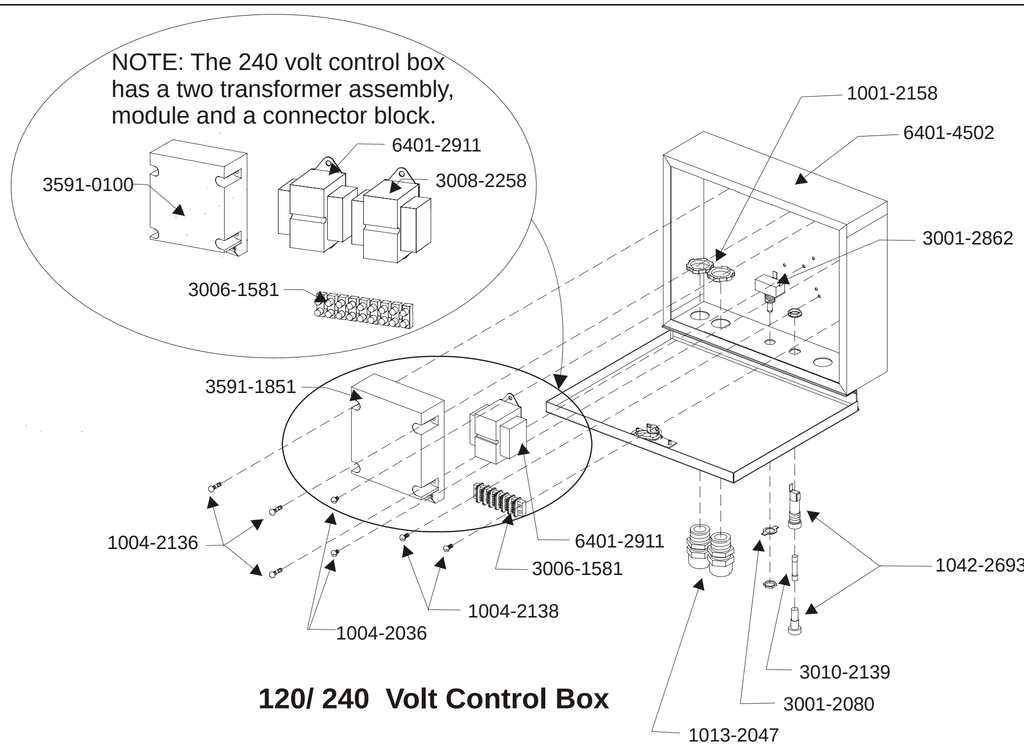
Models SS-225-XL, SS-200-XL, SS-175-XL, SS-120-XL





Models SS-225, SS-200-XL, SS-175-XL and SS-120-XL

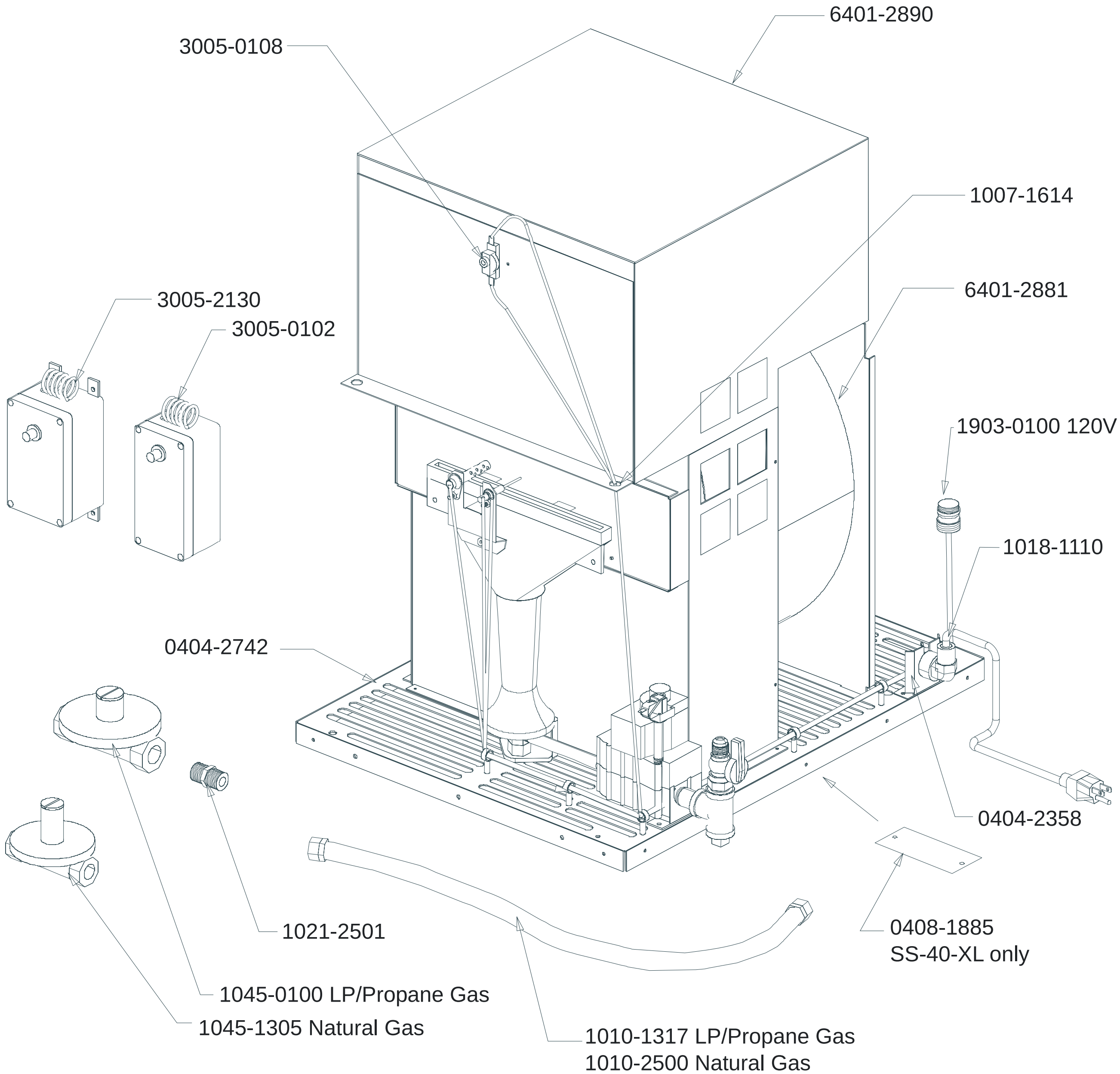




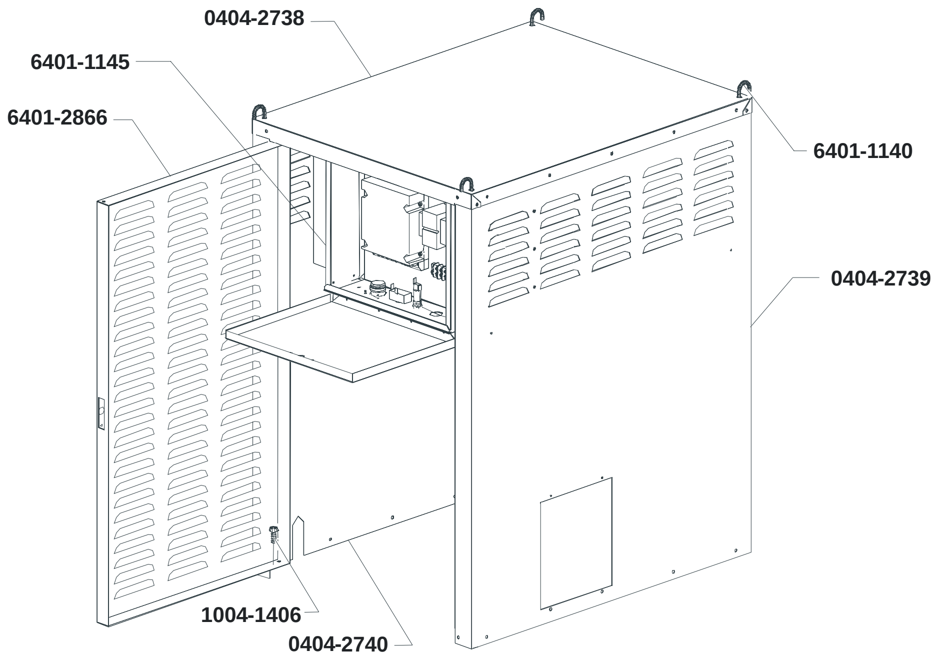
120/ 240 Volt Control Box

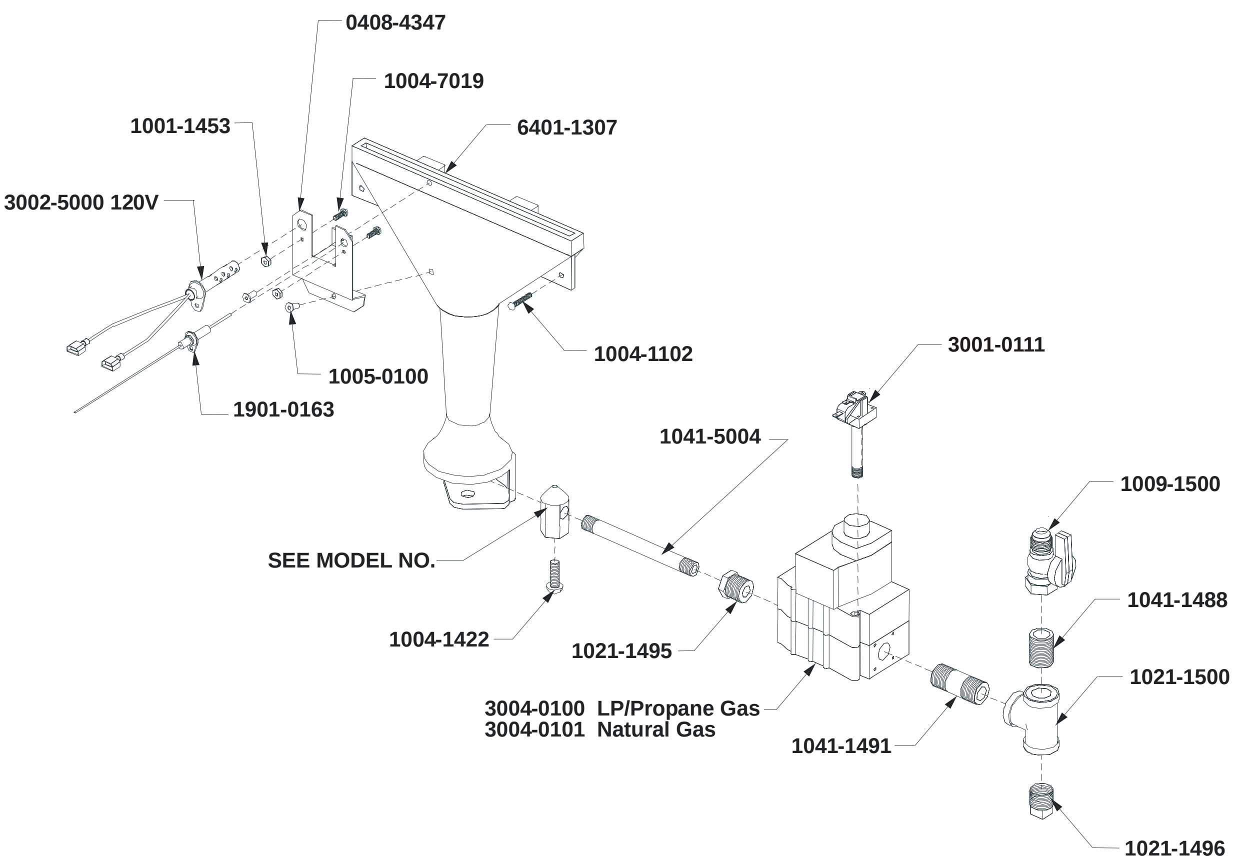
When ordering service parts, please specify the country, model number, date of manufacture, voltage, frequency, gas type, inside or outside mount, and whether the heater is constructed of galvanized or stainless steel.

Model SS-75-XL and Model SS-40-XL

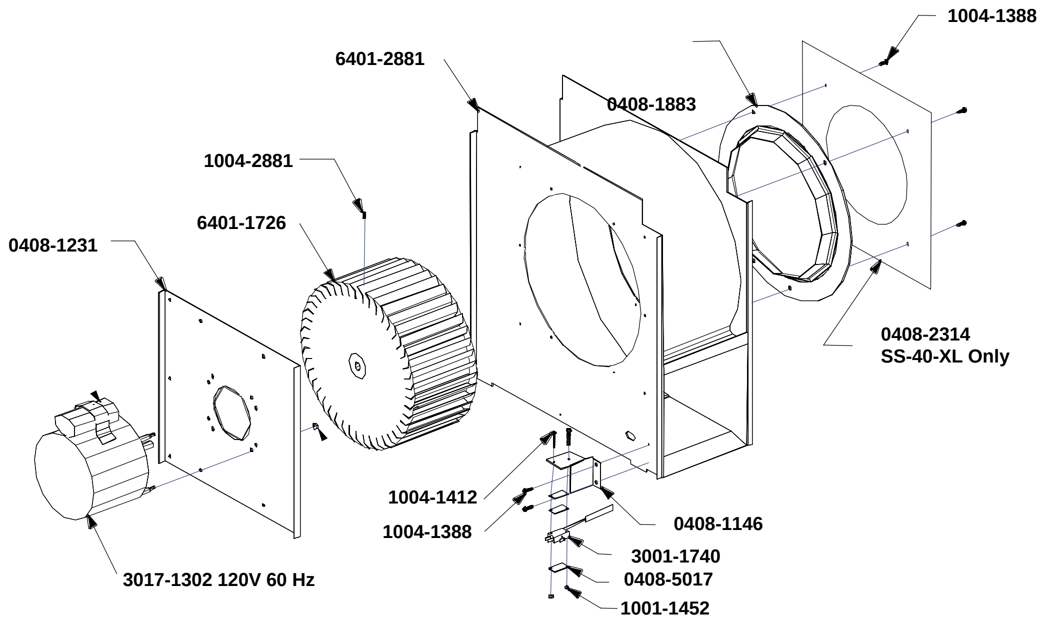


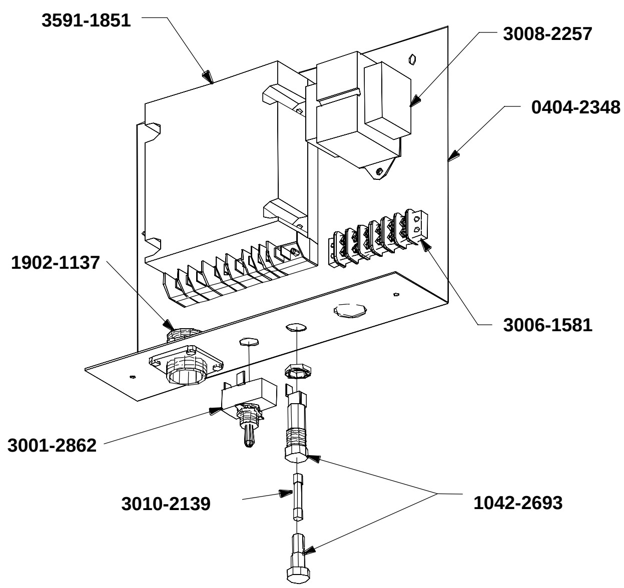
Models SS-75-XL and SS-40-XL





Models SS-75-XL and SS-40-XL





120 Volt Heater Plate

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